Simon and Kahn versus *Global 2000*

New book will offer sharp contrast to the assumptions and methodology of the cheerless Carter-sponsored report

Futurist Herman Kahn, who died of a heart attack on 7 July, left behind a partially completed book that has attracted a good deal of attention even though it will not appear until some time next year. Coedited by Kahn and economist Julian Simon, who shares Kahn's optimistic vision of the future of the globe, the book is an attempt to refute the conclusions of *Global 2000*, an influential report issued by the Carter Administration in 1980.

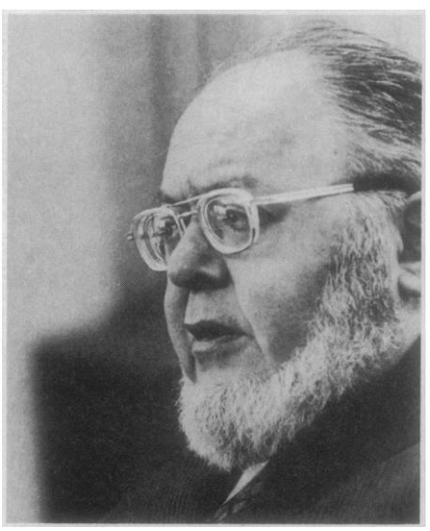
Global 2000 said that if present policies continue, the future in terms of population, resources, and the environment does not look good. Simon, who teaches at the University of Illinois, and Kahn, who headed the Hudson Institute, have argued, in contrast, that the trends by and large look fine and that the world will sort itself out if left to its own devices.

The two schools of thought have met in some preliminary skirmishes, notably at the AAAS annual meeting in Detroit. Presumably the debate will heat up when the book, christened *Global 2000 Revised* and financed by the Heritage Foundation, comes out. But whether it will instruct or further confuse the interested public is open to question.

Global 2000 is, in its way, confused enough. The three-volume study, which is the government's first attempt at a coordinated analysis of the global environment/resources picture, used the resources of 14 agencies and several outside sources to analyze 11 selected "elements," such as food, water, and energy. Although teeming with qualifications and alternate scenarios, it came out with a general picture which, while it steers clear of apocalyptic visions, is not too happy. It predicts that the world is likely to be confronted with ever higher prices for food, oil, minerals, and fertilizer. In less-developed countries (LDC's) it sees increasing soil erosion, little room for expansion of cropland, water shortages, deforestation, loss of species, more overcrowding, and more pollution.

Recommendations based on the report, *Global Future: A Time to Act*, came out in the last days of the Carter Administration and sank out of sight with Carter. As for the original report, it inspired the formation of a coalition called Global Tomorrow (chaired by Russell Peterson, chairman of the National Audubon Society), which recently held a conference in Washington on the report; and a Year 2000 Committee of prominent men (chaired by Russell Train, head of the World Wildlife Fund–U.S.), which is pushing global foresight legislation and doing studies of private sector global data use.

Global 2000 may have a "juggernaut" behind it (Simon's term), but Kahn and Simon have tried to balance it by gathering what Simon calls a group of "world class" authors for their book. The executive summary, which has been widely circulated, is far more provocative than the contributions. Written by Simon and Kahn, it explicitly contradicts the wording in *Global 2000*, saying, "If present trends continue, the world in 2000 will be less crowded, less polluted, more stable ecologically, and less vulnerable to resource-supply disruption than the world we live in now." Based on historical trends, it predicts declining scarcity, lowering prices and increased wealth. Trends in forests are "not worrisome," and "there is no evidence for the rapid loss of species." Simon frequently extrapolates from United States trends to predict developments in LDC's: For example, he says that as people get richer they will have more floor space in their homes. They will also have better roads and more vehicles. So they will have more room just as Americans have more than they did at the turn of the century.



Herman Kahn

Iconoclast to the end

As for the papers by the 23 authors, Simon and Kahn did not insist they toe the line and most of them eschew extreme positions. Nonetheless, despite the fact that *Global 2000* and *Global 2000 Revised* draw on many of the same original data sources, many findings are distinctly opposed.

Take, for comparison, the food and agriculture paper by D. Gale Johnson of the University of Chicago and the *Global 2000* food section. The two analyses differ markedly in their assessment of the role of fuel prices and environmental disruption in agricultural production. Johnson says that, according to the Food and Agriculture Organization (FAO), there will be an annual rise of 2.8 percent in food production in LDC's—more than enough for nutritional improvement. There is little need to bring new land into production because high yield practices (fertilizer, pesticides, and irrigation) are more efficient. Fertilizer prices, which have remained low, are not necessarily tied to petroleum prices, he says. Increases in per capita income make it implausible that an increasing share of resources will be into food production—as predicted by *Global 2000*—particularly since the percentage of the world's labor force engaged in agriculture has been declining. Prices of basic commodities such as grain and vegetable oils will stay low and may even decline. Increases in life expectancy indicate that malnutrition is declining. "Unavailability of food is no longer an important source of famine" (rather, it is war and strife). Johnson says that his projections are likely to prove valid if hindrances like trade restrictions and artifically low farm prices are removed.

Global 2000 used the government's grain-oilseed-livestock model to conclude that food production will increase at a 2.2 percent annual rate. Because of rising petroleum costs, however, it predicts a 95 percent increase in food prices. It sees rapid rises in costs of fertilizer, pesticides and fuel, and diminishing re-

turns because of accelerated erosion, loss of soil fertility and irrigation damage. Cropland may increase by only 4 percent because the good land is already cultivated and quality land is being lost to urbanization. It says that the World Bank estimates the number of malnourished people in LDC's could rise to 1.3 billion in 2000 and a substantial increase in the share of the world's resources devoted to food production will be needed to meet demand.

There are similar conflicts between the two studies in their analysis of world fisheries. John Wise says that the world haul, now at 70 million tonnes a year, will probably continue to increase for the next two decades. It will reach the FAO-predicted total of 100 to 120 million tonnes by 2000. Primary gains could come from improved management and harvesting or lightly exploited stocks. Possible further gains could come from finding new ways to fish krill and other unconventional species; developing ways to use fish meal directly as human food, and reducing discards at sea, and spoilage. Although overfishing has been a problem, pollution has had little effect on large-scale marine fisheries.

Global 2000 asserts that traditional marine fish populations are now fully exploited, and the generally accepted annual potential of 100 million tonnes is unlikely on a sustained basis. Even if that figure is reached it would supply slightly less protein per capita—for a population of 6.35 billion—than it does now. (Wise, using the same figures, finds an increase in per capita protein.) Increasing ocean pollution is likely to effect significant reduction in yields, and improved technology has already masked real declines in fish populations. Increased harvest from lightly exploited areas and nontraditional species are inhibited by severe economic (that is, oil prices), technological, and management constraints.

An indication of the problems in forecasting fish catches is that the two analyses even differ on trends over the past decade, although they use the same set of figures. Wise, for example, maintains that the global haul rose by 10 percent in the 1970's, while *Global 2000* says the harvest leveled off in 1970.

Why the radical discrepancies, not only in future projections but in assessment of the current situation? There appear to be at least two explanations, one relating to the methodology, and the other to underlying assumptions.

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In the Kahn-Simon book, the subjects are pretty much treated in isolation, with no reference to what may be pertinent trends outside the author's field. The creators of *Global 2000*, on the other hand, went through an agonizing process trying to integrate the data on each topic with data on everything else. This was extremely difficult because the computerized models used by each agency are generally devoted to narrow sectoral concerns or designed to justify particular policies. The energy model, for example, was intended to prove Project Independence would work by 1985.

Modelers often make assumptions about resources availability without referring to related efforts in other departments. Someone engaged in crop forecasting, for example, will assume the availability of a certain amount of water, which is also needed by an energy planner. So the two analysts may end up assuming 150 percent of the available water. Individual sectoral models thus often have to be modified in the light of other sets of projections.*

Nonetheless, after coordinating all the diverse sources, the creators of *Global 2000* felt they had come up with the best data available.

Kahn and Simon are inclined to think *Global 2000*'s struggles were nothing but a huge waste of time. "Our philosophy is totally different," Kahn said last month. "We are hostile to big models . . . any attempt to have a global model to integrate everything becomes uncontrollable" and is "of dubious value." What about resolving inconsistencies? "If you find inconsistencies the model is better off without them." Simon agrees that the number of factors calibrated into an analysis has to be reasonably small or "you'll never get on with your work." For example, the Kahn-Simon summary says: "The future price of energy is not a key input for estimating the future price and quantity of food." They believe in trend analysis: extrapolating "simplistically with ruler and pencil" produces better results, said Kahn. All the global modelers get is *gigo*—"garbage in, gospel out."

Methodology, then, is one of the main areas where the two works differ. Another is in their concepts of the overall direction of human history. *Global 2000* depicts a time of historical discontinuity in which traditional ways of doing things and the old supply-demand equations will lead eventually to pillage and desecration of natural resources and increasing human misery. *Global 2000 Revised* reflects a belief in humanity's continuing ability to sort everything out for the best.

Global 2000 Revised also seems to put a lot more faith in man's ingenuity and the rate of technological advance than does *Global 2000*. For example, if the oil runs out, the former believes new substitutes will be found, whereas the latter is more likely to see higher prices and more pressures on the environment.

The free play of market forces—in-

*Here is an example from the report of efforts to correlate various assumptions on food, population, environment, and gross national product (GNP):

". . . the food projections show that . . . there will be some declines in food per capita. . . . This reinforces the finding of the per capita GNP projections that social and economic conditions will not improve throughout the world.

"The food projections also assume there will be no constraints on water development for agriculture. But this is contradicted by the water, forestry, and environmental projections, implying that a downward adjustment should be made to the food projections.

"The food projections also assume that land deterioration . . . will not occur. But this is contradicted by the environmental projections, implying the need for further downward adjustments to the food projections. . . .

"Downward adjustments to the per capita food projections would necessitate increases in the population projections. . . .

"Higher population projections would in turn probably increase the severity of water problems . . . and the rate of land deterioration . . . further lowering the food projections . . .

". . . if one wanted to adjust the food, GNP or population projections for consistency . . . where is one to begin—or end? Where is the lever and where is the fulcrum?"

cluding natural ones—is fundamental to the Simon-Khan vision, whereas the problems as *Global 2000* sees them would seem to call for government policy changes on every level.

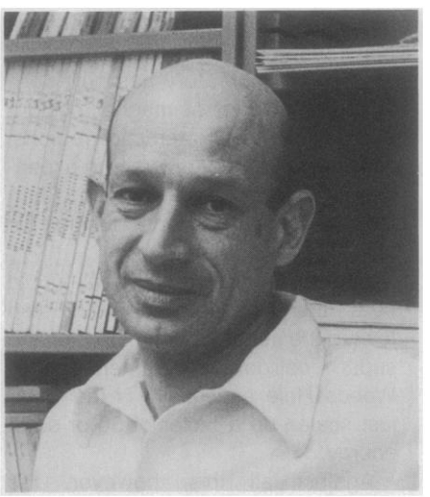
The faith in the ability of market forces always to promote equilibrium is apparently why it was not deemed crucial to have a discussion of population growth in *Global 2000 Revised*. There is a paper by Mark Perlman of the University of Pittsburgh on the difficulties of making population projections, but according to Simon, the editors decided not to go into the implications of such growth because they did not want to divide the authors. Anyway, he said, populations level off by themselves when they reach a certain stage of economic well-being. Needless to say, *Global 2000* is not complacent about population growth.

Finally, as Kahn pointed out, there is a real difference in the way the two reports view nature. *Global 2000* is very much an environmentalist document; the subject is a core consideration in every topic discussed. Not so in the Simon-Kahn book: there is no mention of environmental considerations, for example, in the energy or agriculture articles. Kahn said the omission is appropriate: he took the Old Testament view that "everything that creeps or crawls exists for man's benefit," which, he said, is basically the attitude of traditional western culture and one that is shared by the authors (with an exception for Roger Revelle of the University of California at La Jolla who gave permission for a paper on land to be reprinted but who is "not very enthusiastic" about their approach). Kahn argued that *Global 2000* reflects a trend toward eastern thinking in which every living thing is believed to have an intrinsic right to exist.

Simon and Kahn's views correspond in many respects to those of the Reagan Administration. Some of the ideas are explicitly stated in a paper drafted in January, reportedly by presidential adviser Danny J. Boggs, for the Global Issues Working Group, which advises the Cabinet Council on Natural Resources and Environment.

After quoting from the somber introduction of *Global 2000*, the paper says "Rather, from our experience . . . if the economies and societies of much of the world remain reasonably free, if technological advance is permitted to continue, and if prices are permitted to bring changes in supply and demand into equilibrium, the world in the year 2000 will, in general, be a better place for most people than it is today. Although there will be more people in the world, each of them should have more individual living space. . . . There will very likely be greater material output for each person. . . . In many cases, technological and economic advance will be the key . . . to . . . environmental progress."

The paper goes on to discuss the value of global modeling and the improvement of government "foresight" capability, which has become of particular concern to the *Global 2000* groups. People like Train and Peterson are pushing hard to get some kind of legislation passed that would improve the government's ability to make comprehensive analyses and recommendations related to global population, resource, and environmental trends. Proposals vary, but basically the idea is not to have a monolithic global model—which all agree would be undesirable—but to facilitate interaction among various models, get the assumptions documented, the data more compatible and the inconsistencies made explicit. There are currently two bills pending: one introduced by Representatives Albert Gore, Jr. (D–Tenn.), and Newt Gingrich (R–Ga.) would establish an "office of critical trends analysis" in the White House to evaluate trends and the impact of government policies on them. The other by Senator Mark Hatfield (D–Ore.) would establish a "council on global resources, the environment and population" to improve projections. It also calls for a national policy of population stabilization.



Julian Simon

Faith in the market

Innocuous as the legislation may seem, people have definitely political reasons for supporting or opposing it. Boggs, in the White House document, says the "tendancy of such a centralization in an office would be to promote its capture and use by those who advocate a higher degree of governmental direction." He also notes that the "celebrated alarmist reports of the past . . . have underestimated the adjustive capacity and technological innovation of people" and have been "determinedly anti-market and anti-improvement by nongovernmental means."

Speaking at the conference held by the Global Tomorrow Coalition, Boggs pointed out that foresight can be wrong, as illustrated by such analyses as *Famine 75* by William and Paul Paddock and Paul Ehrlich's *Population Bomb*. "Would you want such an office run by Julian Simon or Herman Kahn?" he asked. Boggs later told *Science* he didn't think the problems of coordinating models was as great as *Global 2000* made out. He said "The notion that there is this commodity called foresight and if you will only buy a tube of it you'll come out with the right answers seems to me disingenuous." Supporters of the legislation, he felt, were saying "the world is going to hell in a handbasket and by passing this law we really want you to confess it and say so."

Boggs is on target in the last remark. An environmentalist told *Science* the Administration disliked the idea because it knew improved foresight would present facts that did not fit its dogma.

The Global Issues Working Group is currently preparing a report on the appropriate governmental role in global issues—presumably an expanded version of the January document. In view of the political and methodological poles represented by *Global 2000* and *Global 2000 Revised*, it will be interesting to see what they come up with. Alan Hill, chairman of the Council on Environmental Quality (CEQ), who initiated the study, says it will be a general document on resource, environment, and population issues to come out around the first of the year. "We've avoided saying this will be our answer to *Global 2000*," he says, explaining that the data will be better, thanks to the spadework done in the course of preparing that report. CEQ has also commissioned the World Wildlife Fund to look at the global data needs of the private sector.

It appears then that *Global 2000*, while it has not had the intended impact on government policy, is serving as the basis for ever-widening circles of dialogue about global issues. Rather than scaring the public out of its wits, as critics have claimed, the growing coalition spawned by the report is provoking others to reexamine common assertions about the world situation. So market forces are at work on the commodity, knowledge.

—CONSTANCE HOLDEN